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# PHILOSOPHICAL TRANSACTIONS.

Januar. 25. 1673.

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*A Letter of the learned Franc. Linus, to a Friend of his in London, animadverting upon Mr. Isaac Newton's Theory of Light and Colours, formerly printed in these Tracts.*

Honoured Sir,

Understanding, that Things of the Nature I now write, are always welcome unto you, from what hand soever they come, I thought good, though unknown to you, to give you Notice, That perusing lately the *Philosophical Transactions*, to see what I could find therein, in order to a little Treatise of Opticks I have in hand; I lighted in page 3075, upon a Letter of Mr. Isaac Newton, Professor of Mathematicks in the University of Cambridge, wherein he

he speaks of an Experiment he tried, by letting the Sun-beams through a little hole into a dark Chamber; which passing through a glas Prism to the opposite Wall, exhibited there a *Spectrum* of divers Colours, but in a Form much more long then broad: Whereas, according to the received Laws of Refraction, it should rather have appeared in a circular Form. Whereupon conceiving a defect in those usual Laws of Refraction, he frames his new Theory of Light, giving to several Rays, several refrangibilities, without respect to their Angles of Incidence, &c.

Truly, Sir, I doubt not of what this learned Author here affirms; and have my self sometimes in like Circumstances observed the like difference between the Length and Breadth of this coloured *Spectrum*; but never found it so when the Sky was clear and free from Clouds, near the Sun; but then only appeared this difference of Length and Breadth, when the Sun either shined through a white Cloud, or enlightned some such Clouds near unto it. And then indeed it was no marvel, the said *Spectrum* should be longer than broad; since the Cloud or Clouds, so enlightned, were in order to those Colours like to a great Sun, making a far greater Angle of Intersection in the said hole, then the true Rays of the Sun do make; and therefore are able to enlighten the whole length of the Prism, and not only some small part thereof, as we see enlightned by the true Sun-beams coming through the same little hole. And this we behold also in the true Sun-beams, when they enlighten the whole Prism: For, although in a clear Heaven, the Rays of the Sun, passing through the said Hole, never make a *Spectrum* longer than broad, because they then occupy but a small part of the Prism; yet if the Hole be so much bigger as to enlighten the whole Prism, you shall presently see the length of the *Spectrum* much exceed its breadth; which excess will be always so much the greater, as the length of the Prism exceeds its breadth. From whence I conclude, that the *Spectrum*, this learned Author saw much longer then broad, was not effected by the true Sun-beams, but by Rays proceeding from some bright Cloud, as is said, and by consequence, that the Theory of Light grounded upon that Experiment, cannot subsist.

What I have here said, needs no other confirmation than meer Experience, which any one may quickly try; neither have I only tried the same upon this Occasion, but near 30 Years ago shewed the same, together with divers other Experiments of Light, to that worthy Promoter of Experimental Philosophy, Sir *Kenelm Digby*, who coming into these Parts to take the Spaw-waters, resorted oftentimes to

to my darkned Chamber, to see those various Phænomena of Light made by divers Refractions and Reflexions, and took Notes upon them; which industry if they also had used, who endeavour to explicate the aforesaid Difference between the length and breadth of this coloured *Spectrum*, by the received Laws of Refraction, would never have taken so impossible a Task in hand.

The rest is, Honour'd Sir, That it is far from my Intent, that the Mistake here mentioned, do any way derogate from that learned Person: Which truly might have happened to my self, if at my first tryal thereof, the Sun had been in a white Cloud, as it seems, it happened to him. Wherefore ceasing further to trouble you, I rest,

Yours to command,

6 Octob. 1674.

Francis Linus.

Sir,

*An Answer to this Letter.*

THE Letter you thought fit to write by way of Animadversion upon Mr. Newton's new Theory of Light and Colours, grounded upon an Experiment of letting the Sun-beams through a little hole into a dark Chamber, seems to need no other Answer but this, That you would be pleased to look upon, and consider the Scheme in Mr. Newton's 2d Answer to P. Pardies, in Numb. 85. of the *Ph. Transactions*; and rest assured, that the Experiment, as it is represented, was tried in clear Days, and the Prism placed close to the hole in the Window, so that the Light had no room to diverge; and the colour'd Image made not parallel (as in that conjecture) but transverse to the Axis of the Prism.

London, Decem. 17. 1674.

*Extracts of two Letters, written by Mr. Flamsteed to Mr. Collins; the one of Novemb. 25. 1624, concerning an Instrument to shew the Moon's true place to a minute or two; as also the Writer's design of correcting the hitherto assign'd Motions of the Sun: The other, of Decemb. 14. 1674. touching the necessity of making New Solar Numbers, together with an Expedient for making trial, whether the Refractions in Signor Cassini's Tables are just.*

*The Extract of the first Letter.*

After my return to Derby, I fell to peruse Mr. Street's Discourse, and to consider the Contrivance of his *Moon-wiser*; which though he affirms in the Conclusion of his little Tract, to be different from Mr. Horroxes; yet I can assure, that for the *Motion of Longitude*, 'tis the very same, and no other than what is taken from my *Explanation*, save that, where I thought the manner of *Librating the Apogéum* was obvious from the Calculation, and needed not to be ex-